

Change of Phase/State (Phase Transition) with Examples

Change of Phase

Matter can be in three states like solid, liquid and gas. The distance between the molecules or atoms of the matter shows its state or phase. Temperature and pressure are the only factors that affect the phases of matter. Under constant pressure, when you heat matter, its speed of motion increases and as a result the distance between the atoms or molecules becomes larger. If you give heat to a solid substance, its temperature increases up to a specific point and it starts to change its phase from solid to liquid. Another example that all of you experience in daily life, when you heat water it boils and if you continue to give heat it starts to evaporate. In this section we will learn these changes in the phases of substances and learn how to calculate necessary heat to change the states of them.

UNDER CONSTANT _____, THE MORE YOU HEAT MATTER,
THE MORE _____ OF MOTION.

THE MORE _____ OF MOTION, THE MORE _____ BETWEEN
THE _____ OR _____.

Melting and Freezing

If solid matters gain enough heat they change state solid to liquid. Heat is a form of energy and in this situation it is used to break the bonds of the atoms and molecules. Heated atoms and molecules vibrate more quickly and break their bonds. We call this process **melting** changing state from solid to liquid. Inverse of melting is called **freezing**, changing state from liquid to solid, in which atoms and molecules lose heat and come together, their motion slows down and distance between them decreases.

BY HEATING MATTER WE CAN _____ THE _____ OF
ATOMS AND _____.

Boiling Evaporation and Condensation

Vaporization is the change of phase from liquid to gas. There are two forms of vaporization: Evaporation and boiling.

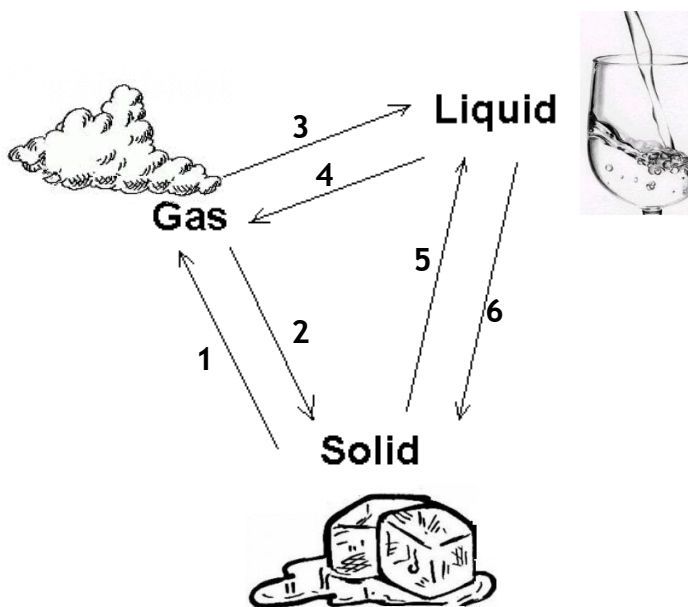
Evaporation occurs only at the surface of the water and at every temperature.

However, when you give heat to liquid, at one certain point its temperature does not change. Gained heat is spent on breaking the bonds between molecules and atoms. At this critical temperature (the boiling point), vaporization occurs in every part of the liquid which is called boiling. Boiling point is a distinguishing property of liquids; each matter has its own boiling point. For example, water boils at 100 °C in atmospheric pressure. We use the following formula to find required heat to boil liquid matter.

THERE ARE TWO KINDS OF VAPORIZATION: _____, ONLY AT THE SURFACE OF THE LIQUID AND AT _____ TEMPERATURE, AND _____, WHEN WE REACH THE CRITICAL TEMPERATURE ALSO CALLED _____.

Sublimation

Sublimation is the change of state from solid to gas. Some of the solid matters change their states directly to the gas with the gained heat. For example, dry ice (frozen CO₂) sublimate when heat is given. Inverse of this process is called deposition, in which gas matters lose heat and change their phase to solid.



Melting	
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Condensation	
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Vaporization	
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Sublimation	
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Freezing	
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Deposition	
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